B.C.A. (4th Semester)

DSE4 030010411: Multi-paradigm Programming

Teaching Schedule

Objective: To develop an application through programming language which support multiple programming paradigm including object oriented, pattern matching, imperative, functional programming and protocols.

Course Outcomes: Upon completion of the course, students shall be able to

CO1: Apply the concepts of Lists, Dictionaries and Sequence to develop an application.
CO2: Illustrate the concepts of function, class and package.
CO3: Develop string manipulation based application using re module.
CO4: Develop an application for handling Files and Directories.
CO5: Develop an application for sending mail using SMTP protocol.
CO6: Develop a network application using socket module.

Unit	Sub Unit	No. of Lecture(s)	Topics	Reference Chapter/Additional Reading	Teaching Methodology to be used	Evaluation Parameters
Unit 1 : Introduction						
1	1.1	1	Multi-paradigm Programming Language: Object-oriented, Imperative and Functional programming	http://people.cs.clemson.edu/~turner/courses/cs428/current/webct/content/pz/ch2/ch2_6.html	Chalk and Talk	
1	1.2	1	Lexical structure of python	AM - #4 Page No. 33 – 38	Chalk and Talk	
1	1.3	1	Numbers and Operators	JP - #2 Page No. 15 – 28	Demonstration and chalk and talk	
1	1.4	1	Variables	JP - #3 Page No. 31 – 34	Demonstration and chalk and talk	
1	1.5	2	Built-in Types: Tuples, Lists, Sets and Dictionaries	JP - #3 Page No. 34 – 47	Demonstration and chalk and talk	

					http://spoken-tutorial.org/watch/Python/Sets/	
1	1.6	1	print statement	AM - #4 Page No. 61 – 62 JP - #1 Page No. 08 – 13	Demonstration and chalk and talk	Quiz
Unit 2 : Basic flow statement and Classes						
2	2.1	1	Making Decision: if statement and repetition	JP - #4 Page No. 51 – 65	Demonstration and chalk and talk	
2	2.2	1	Handling Errors: try statement	JP - #4 Page No. 65 – 67	Demonstration and chalk and talk	
2	2.3	1	Functions	JP - #5 Page No. 71 – 88	Demonstration and chalk and talk http://spoken-tutorial.org/watch/Python%2BOld%2BVersion/Functions/	
2	2.4	2	Classes and Object	JP - #6 Page No. 93 – 107	Demonstration and chalk and talk	Unit Test-1
2	2.5	1	Module Objects: import statement, from statement	AM - #7 Page No. 139 – 143 JP - #10 Page No. 159	Demonstration and chalk and talk	
2	2.6	1	Packages	JP - #7 Page No. 118 – 121	Demonstration and chalk and talk	
Unit 3 : Strings and Regular Expressions						
3	3.1	2	Methods of String objects: find( ), join( ), replace( ), split( ), splitlines( ),title( ),	AM - #9 Page No. 186 – 191	Topic Slides and Demonstration	

			strip( )			
3	3.2	2	String module	AM - #9 Page No. 191 – 193	Topic Slides and Demonstration	
3	3.3	3	String formatting	AM - #9 Page No. 193 – 197	Topic Slides and Demonstration	Open Book Test
3	3.4	3	Regular expression and the re Module: match( ) and search( )	AM - #9 Page No. 201 – 212	Topic Slides and Demonstration	
Unit 4 : Files and Directories						
4	4.1	2	File Objects	JP - #8 Page No. 127 – 131	Topic Slides and Demonstration http://spoken-tutorial.org/watch/Scilab/File%2Bhandling	
4	4.2	1	Path and Directories	JP - #8 Page No. 131 – 132	Topic Slides and Demonstration	
4	4.3	1	os Module	JP - #8 Page No. 132 – 140	Topic Slides and Demonstration	
4	4.4	2	Retrieval of data from XML file	JP - #15 Page No. 265 – 284	Topic Slides and Demonstration	
Unit 5 : Protocols and Mail Server						
5	5.1	2	Comparing Protocols and Programming Languages	JP - #16 Page No. 289 – 290	Topic Slides	
5	5.2	2	Internet Protocol Stack	JP - #16 Page No. 290 – 291	Topic Slides	
5	5.3	2	MIME Multi-part Messages	JP - #16 Page No. 297 – 302	Chalk and Talk	Unit Test-2
5	5.4	3	Sending mail with SMPT	JP - #16 Page	Topic Slides	

				No. 303 – 306	and Demonstration	
Unit 6 : Socket Programming						
6	6.1	2	Socket: Introduction	AM - #20 Page No. 520 – 523	Topic Slides	
6	6.2	3	Socket Class and Methods: socket( ), connect( ), send( ), error( ) and close( )	AM - #20 Page No. 523 – 528	Topic Slides and Demonstration	
6	6.3	2	SocketServer Module: handle( ), request( ) and server( )	AM - #20 Page No. 528 – 532	Topic Slidesand Demonstration	
6	6.4	2	Event-Driven Socket Program: select Module-select( )	AM - #20 Page No. 533 – 544	Topic Slides and Demonstration	Internal

References :

1. J. Payne, "Beginning Python", Wrox.[JP]
2. A. Martelli, Python in a nutshell, O Reilly.[AM]

Note: # denotes chapter number.

Course objectives and Course outcomes mapping:

To develop an application through object oriented concepts: CO1, CO2

To support multiple programming paradigm such as pattern matching and imperative: CO1, CO3, CO4

To use functional programming and protocols: CO5, CO6

Course units and Course outcome mapping:

Unit No.	Unit	Course outcome					
		CO 1	CO2	CO3	CO4	CO5	CO6
1	Introduction	✓					
2	Basic flow statement and Classes	✓	✓				
3	Strings and Regular expressions	✓	✓	✓			
4	File and Directories		✓		✓		
5	Protocols and Mail Server		✓			✓	

6	Socket Programming						✓

Programme Outcomes:

PO1: Proficiency in and ability to identify problems related to computer science as well as design and apply computational knowledge to solve them.

PO2: Ability to design, develop, test and maintain system, component, product or process as per needs and specification.

PO3: Understanding of professional and ethical role and responsibility.

PO4: Recognition of the need for and ability towards life-long learning

PO5: Knowledge of programming languages, database systems, operating systems, software engineering, Web & Mobile technology and relevant modern issues.

PO6: Ability to demonstrate the use of modern tools, models and languages to solve problems related to software development.

PO7: Ability to communicate and present knowledge effectively.

Course outcome and Programme Outcome mapping:

Course Outcomes	Program Outcomes					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1		✓				✓
CO2		✓		✓		✓
CO3	✓	✓		✓		✓
CO4		✓	✓	✓	✓	✓
CO5		✓	✓	✓	✓	✓
CO6		✓	✓	✓	✓	✓

Computing Environment:

A student must have the following computing environment available in laboratory as well as in his/her personal laptop.

- Python IDLE 2.7.3

Modes of Transaction (Delivery):

Unit No	Topic Detail	Teaching Approach	PO mapped
3&4	String, regular expression	Group of 2 students shall be framed and specific definition shall be given by course teacher to develop the solution.	PO2, PO3, PO4, PO5

	and file object	The solution developed by one group shall be further executed and optimized by the other group.	PO6, PO7

Activities/Practicum:

The following activity shall be carried out by the students.

- Install Python 2.7 version.

The following activity shall be carried out by the teacher.

- Demonstration of database connectivity.

Learner	Activities to be done	PO mapped
For weak learners	After observing category of students who require more attention, course teacher shall arrange extra lecture session on Saturday and made them sit with good students in laboratory sessions.	PO2, PO3, PO4, PO5, PO6
For advanced learners	The Python package name for self creation parameter must be given by course teacher to work upon. The team needs to present their work in front of class mates.	PO2, PO3, PO4, PO5, PO6
For all	As mentioned in above teaching approach.	

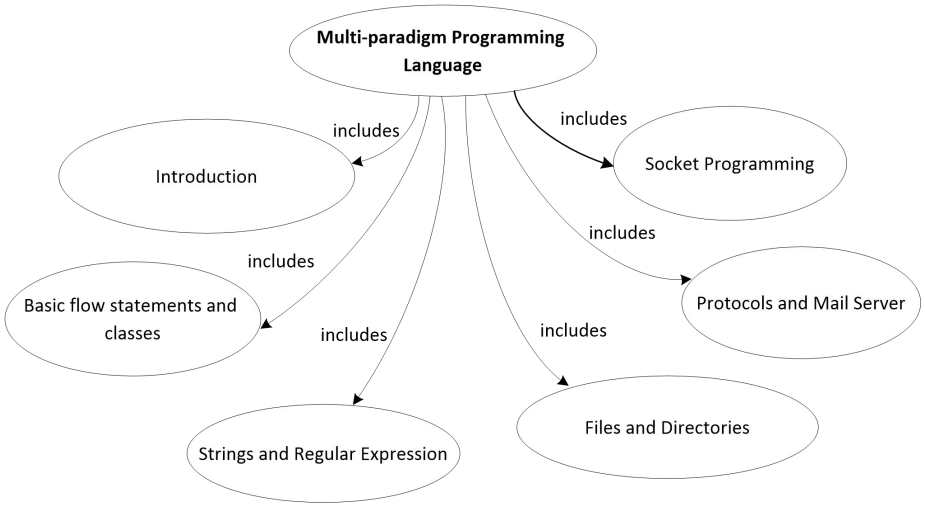
Number of Practical Problems in Journal: 18

Total sets to be developed for each division: 2

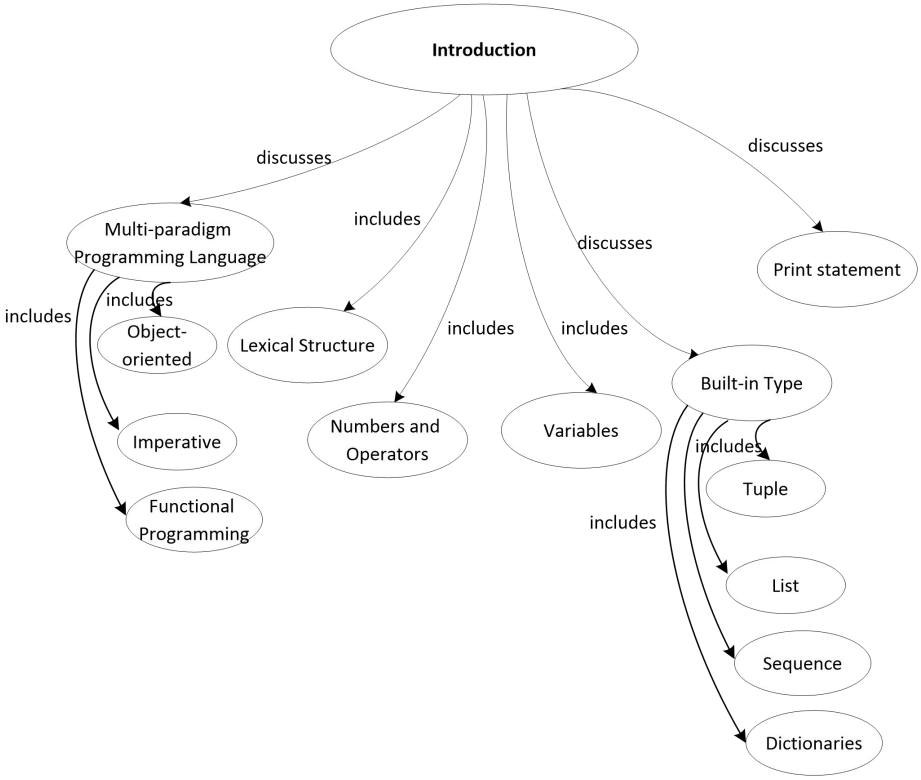
Unit Number	Number of Questions	Time required to implement and debug the question (in hours)	Minimum required of Journal Certification
2	6	14	6
3	3	9	3
4	3	9	3
5	3	8	2
6	3	8	2
TOTAL	18	48	16

Concept map:

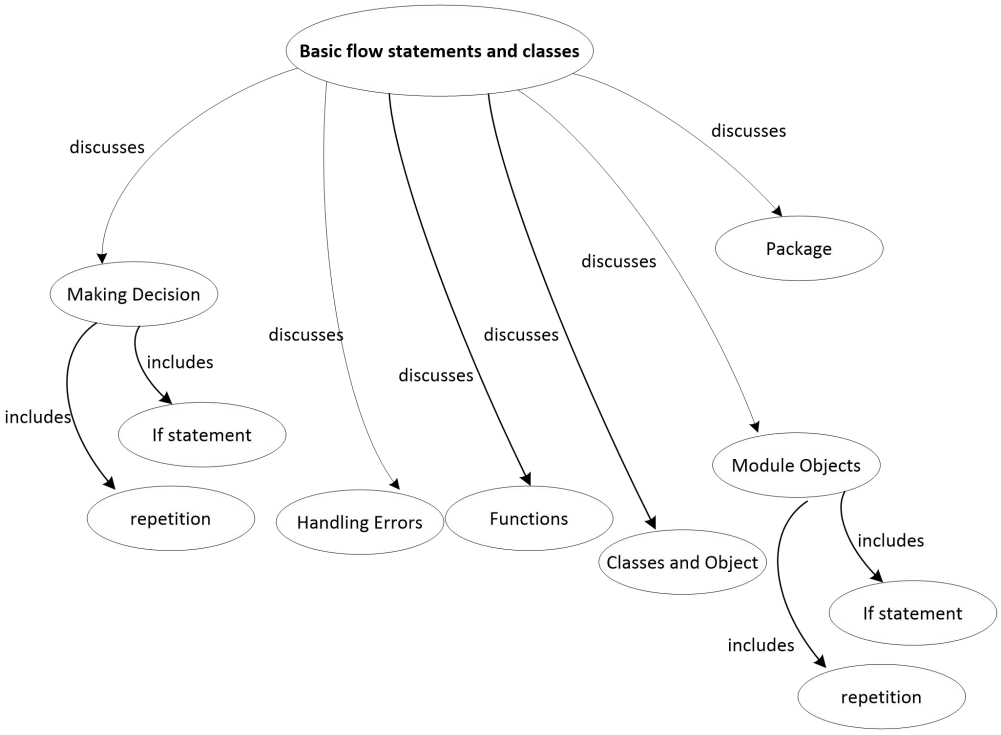
Multi-paradigm Programming Language


Multi-paradigm Programming Language
includes
Introduction
includes
Socket Programming
includes
Basic flow statements and classes
includes
Protocols and Mail Server
includes
Strings and Regular Expression
includes
Files and Directories

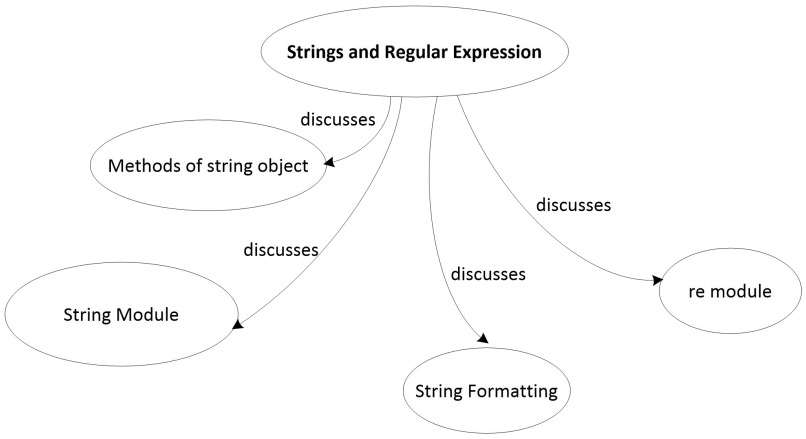
Unit-1:


Introduction
discusses
Multi-paradigm Programming Language
includes
Lexical Structure
includes
Numbers and Operators
includes
Variables
discusses
Built-in Type
discusses
Print statement
includes
Object-oriented
includes
Imperative
Functional Programming
includes
Tuple
includes
List
Sequence
Dictionaries

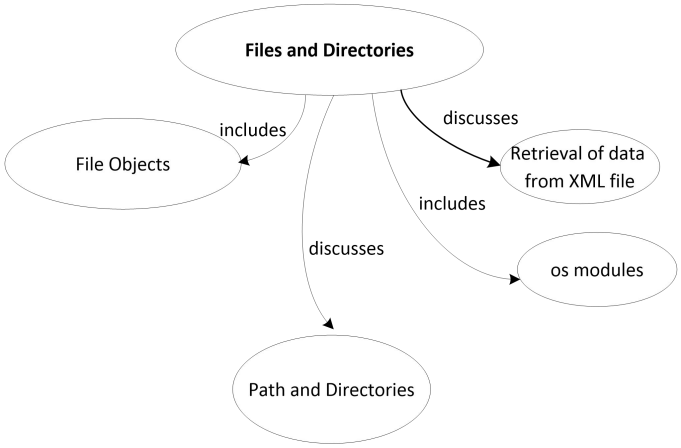
Unit-2:


Basic flow statements and classes
discusses
discusses
discusses
discusses
discusses
discusses
discusses
Making Decision
Package
includes
includes
If statement
repetition
Handling Errors
Functions
Module Objects
Classes and Object
includes
If statement
includes
repetition

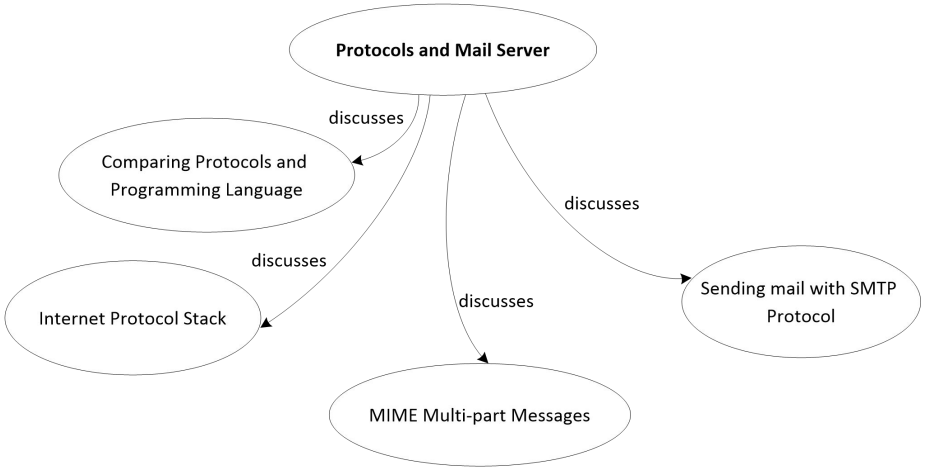
Unit-3:



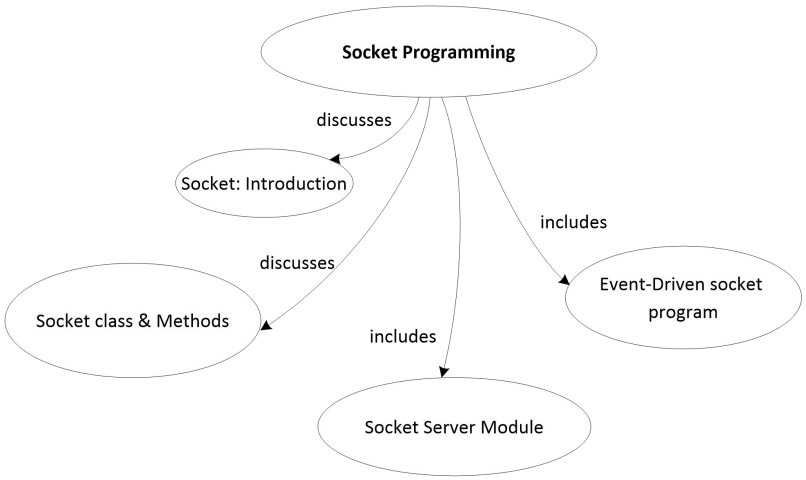
Unit-4:



Unit- 5:



Unit -6:


Socket Programming
discusses
Socket: Introduction
discusses
Socket class & Methods
includes
Socket Server Module
includes
Event-Driven socket program